

What is Claimed:

1. A mega-boule for use in fabricating microchannel plates (MCPs), the mega-boule comprising

a cross-sectional surface including at least first, second and third areas, each area occupying a distinct portion of the cross-sectional surface;

the first and second areas including a plurality of optical fibers, transversely oriented to the cross-sectional surface, each optical fiber having a cladding formed of non-etchable material and a core formed of etchable material; and

the third area disposed interstitially between and surrounding the first and second areas, the third area formed of non-etchable material.

2. The mega-boule of claim 1 further including

at least a fourth area, occupying another distinct portion of the cross-sectional surface;

the fourth area including another plurality of optical fibers of substantially similar materials of the optical fibers of the first and second areas; and

the third area disposed interstitially between and surrounding the first, second and fourth areas.

3. The mega-boule of claim 1 wherein

the etchable material and the non-etchable material are glass, and
the non-etchable material includes a higher lead content than the
etchable material.

4. The mega-boule of claim 1 wherein

the non-etchable material of the third area includes a plurality of support rods transversely oriented to the cross-sectional surface, and

an optical fiber of the plurality of optical fibers and a support rod of the plurality of support rods have a cross-sectional area substantially similar to each other.

1 5. The mega-boule of claim 1 wherein

2 the non-etchable material of the third area includes a plurality of

3 support rods transversely oriented to the cross-sectional surface, and

4 the optical fibers of the first area and a portion of the plurality of

5 support rods are configured for use as an MCP.

1 6. The mega-boule of claim 5 wherein

2 the plurality of optical fibers and the plurality of support rods form a

3 fused monolithic stack, when heated and pressed.

7. The mega-boule of claim 1 wherein

2 the plurality of optical fibers of the first and second areas form
3 transverse microchannels in cores of the plurality of optical fibers, when the cores
4 are etched.

1 8. The mega-boule of claim 1 wherein

2 the first and second areas each form one of a rectangular geometry
3 and a circular geometry.

1 9. The mega-boule of claim 1 wherein

2 the cross-sectional surface is of a predetermined area, and

3 the predetermined area is based on accommodating semiconductor
4 wafer fabrication tools.

1 10. The mega-boule of claim 1 wherein

2 the first and second areas each includes a size corresponding
3 substantially to a size of an active region of an MCP configured as an amplifier for an
4 image intensifier tube.

1 11. A method of forming a plurality of microchannel plates (MCPs)
2 comprising the steps of:

3 (a) providing a bundle of optical fibers, wherein each optical fiber
4 includes a cladding formed of non-etchable material and a core formed of etchable
5 material;

6 (b) stacking a plurality of the bundles to form at least first and
7 second cross-sectional areas, defining first and second mini-boules, respectively;

8 (c) stacking non-etchable material interstitially between and
9 surrounding the at least first and second mini-boules; and

10 (d) fusing the plurality of bundles and the stacked non-etchable
11 material for forming the plurality of MCPs in the at least first and second cross-
12 sectional areas.

1 12. The method of claim 11 further including the steps of:

2 (e) dicing the fused bundles and non-etchable material to form
3 multiple mega-boule wafers, each mega-boule wafer defining a batch die; and

4 (f) activating, and metallizing each mega-boule wafer for forming
5 the plurality of MCPs.

1 13. The method of claim 12 further including the step of:

2 (g) extracting from each mega-boule wafer the plurality of MCPs.

1 14. The method of claim 12 wherein step (f) includes

2 etching each mega-boule wafer to form microchannels in the cores of
3 the optical fibers,

4 reducing the non-etchable material of the cladding of the optical fibers
5 to render the cladding electron emissive, and

6 applying a thin metal layer to each planar surface of the mega-boule
7 for forming electrical contacts on the plurality of MCPs.

1 15. The method of claim 11 wherein step (d) includes

2 heating and pressing the plurality of bundles and the stacked non-
3 etchable material to form a monolithic stack.

1 16. The method of claim 11 wherein step (b) includes

2 stacking the plurality of bundles to form at least first and second cross-
3 sectional sizes of the respective first and second mini-boules to correspond
4 substantially to respective cross-sectional sizes of active regions of MCPs configured
5 as amplifiers for image intensifier tubes.

1 17. The method of claim 11 wherein steps (b) and (c) include

2 stacking the plurality of bundles and the non-etchable material to form a
3 predetermined cross-sectional size, and

4 the predetermined cross-sectional size is based on accommodating
5 semiconductor wafer fabrication tools.

1 18. The method of claim 11 wherein step (b) includes stacking the
2 plurality of bundles to form the at least first and second cross-sectional areas into
3 one of a rectangular geometry and a circular geometry.

1 19. A method of forming a batch die for forming multiple
2 microchannel plates (MCPs) comprising the steps of:

3 (a) providing etchable and non-etchable optical materials; and

4 (b) stacking the etchable and non-etchable optical materials to
5 form a stack having a cross-sectional surface including at least first, second and third
6 areas;

7 wherein the first and second areas are stacked with the etchable
8 optical material and the third area is stacked with the non-etchable optical material,
9 and

10 the third area is disposed interstitially between and surrounding the
11 first and second areas.

1 20. The method of claim 19 wherein

2 the stacking of the etchable and non-etchable optical materials
3 includes forming the first, second and third areas distinctly and separately from each
4 other.